



**31st Annual International Conference of The
Biotechnology Society of Nigeria (BSN)
Covenant University**



**Evaluation of genetic variations in freshwater clams (*Egeria radiata*) using
mitochondrial cytochrome b gene**

Ikpeme, E. V., Johnny, U. U., Ekerette, E. E*, Udensi, O. U. and Ozoje, M. O.

University of Calabar, Department of Genetics
and Biotechnology, Nigeria

SUNDAY 5TH – THURSDAY 9TH AUGUST 2018

Introduction

- *Egeria radiata* is an edible species with shells that contain nutrients of importance in feed and healthcare industries
- *E. radiata* provides employment, income and affordable protein to the local communities where it is obtainable (Daniel and James, 2013).
- In addition to palatability and value of this species [high amount of minerals and vitamins, and low fat content (Ifon and Umoh, 1987)], it is a good source of calcium for pharmaceutical and feed industries (Malu *et al.*, 2009).
- Up until now, researches on *E. radiata* were centred on population growth with no interest in understanding the genetic blue print of this important species.

Introduction

- understanding the genetics of the species will serve as a more powerful tool in the area of its conservation and improvement

- This research was carried out to evaluate the genetic diversity of *E. radiata* in three populations of south-south region of Nigeria using cytochrome b region of mitochondrial DNA.

Objectives

- The following objectives were considered:
 - ✓ To determine the genetic polymorphism of *E. radiata* using mtDNA cyt b.
 - ✓ To determine haplotype variation in three populations of *E. radiata* using mtDNA cyt b.
 - ✓ To determine the genetic distance among three populations of *E. radiata* using mtDNA cyt b.

Methodology

- A total of 53 samples of *E. radiata* were collected from three locations for this study (Itu 17; Southern Ijaw 18 and Burutu 18).
- DNA was extracted from all the samples using Quick-gDNA™ MiniPrep kit (Zymo Research, USA).
- PCR amplification was performed using the primer UCYTB144F-5'-TGAGSNCARATGTCNTWYTG-3' (forward) and UCYTB272R-5'-GCRAANAGRAARTACCAYTC - 3' (reverse)
- Cytochrome b gene of the mitochondrial DNA was sequenced for all the DNA extracts using the same set of primers for PCR.

Experimental Setting

- The chromatograms were viewed and edited using BioEdit 7.2.5 and the sequences aligned with MEGA 6.06 excluding all the gaps.
- Other statistical softwares such as DnaSP and Network were used to assess the genetic diversity in the nucleotide sequences.

Results and Discussion

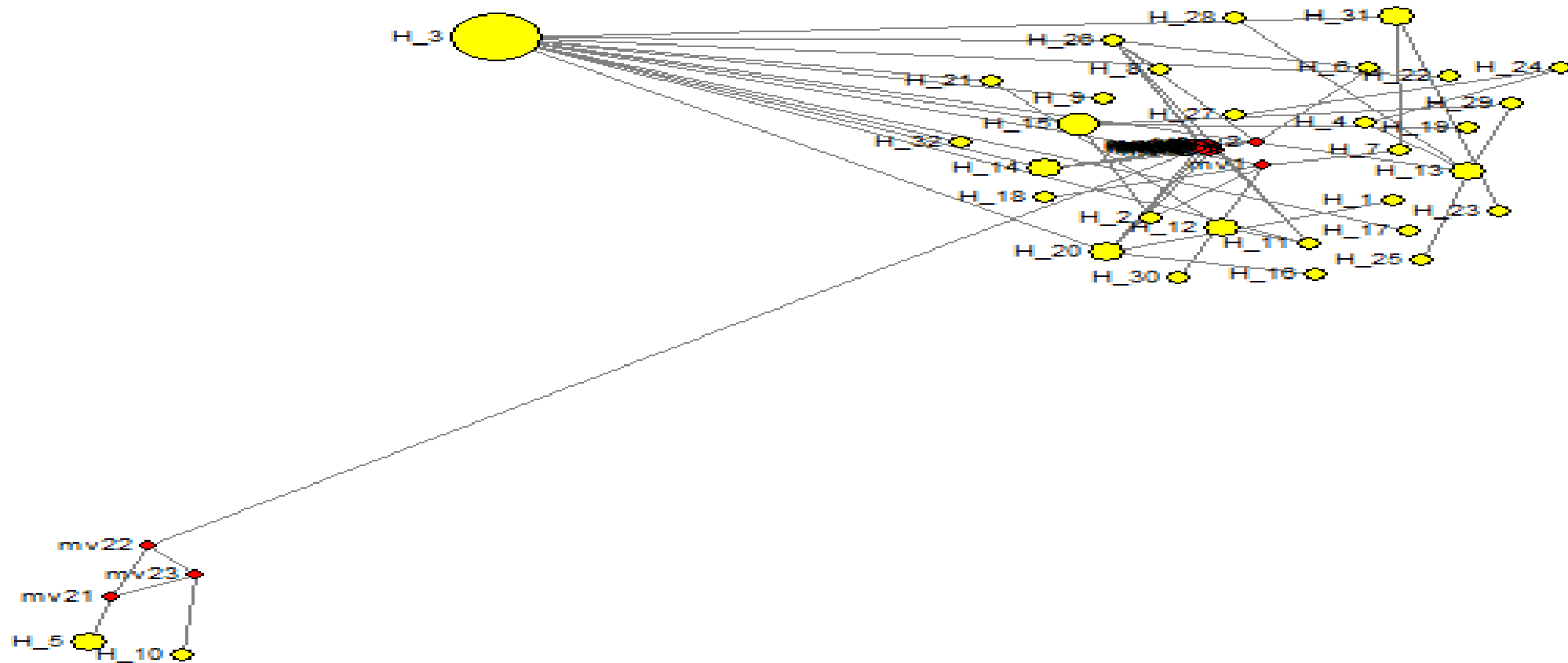
TABLE 1

Diversity indices of *E. radiata* samples from Itu, Ijaw and Burutu populations

Genetic diversity indices	Itu	Ijaw	Burutu
Number of sequence	17	18	18
Number of sites	345	345	345
Polymorphic sites	255	20	12
Parsimony information site	238	11	5
Singleton variable sites	17	9	7
Monomorphic sites	90	325	333
Number of haplotypes	11	14	12
Haplotype diversity	0.88±0.072	0.97±0.030	0.92±0.051
Nucleotide diversity	0.219±0.013	0.012±0.004	0.006±0.003
Average no. of nucleotide differences	75.846	4.059	1.908

The results revealed that haplotype diversity across the population ranged from 0.88 to 0.97 while nucleotide diversity was from 0.006 to 0.219. The low nucleotide diversity suggest low level of genetic polymorphism among *E. radiata* in these populations.

Results and Discussion



Network analysis of the haplotypes did not show population based discrimination. This further suggest genetic similarity among the samples of *E. radiata* irrespective of the different populations.

Results and Discussion

TABLE 2
Genetic distance between populations of *E.radiata*

	ITU	BURUTU	S/IJAW
ITU	-	0.108	0.112
BURUTU	0.108	-	0.014
S/IJAW	0.112	0.014	-

Population genetic distance was lowest between Burutu and Southern Ijaw (0.014), while the highest genetic distance was observed between Itu and Southern Ijaw (0.112). The genetic distance was not wide among the populations which may go further to suggest the genetic relatedness among the samples of *E. radiata* across the three populations.

Conclusions & Recommendations

- Following the non discrimination of the haplotypes based on populations and the low genetic distance observed between the populations of *E. radiata* used in this study, it suggest that there may be low genetic variations among the populations.
- Therefore, there is need for diversification of this species to ensure protection from possible environmental threats.

References

- Daniel, A.& James, W. G. (2013).Age determination and growth rate of the freshwater clam *Galateaparadoxa* (Born 1778) from the Volta river estuary, Ghana.*JournalofAquaticScience*, 1(2): 31-38.
- Ifon, E. T. & Umoh, I. B. (1987). Biochemical and nutritional evaluation of *Egreriaradiata* (clam), a delicacy of some riverine peasant populations in Nigeria. *FoodChemistry*, 24(1): 21-27.
- Malu, S. P., Abara, A. E., Obochi, G. O., Ita, B. I. &Edem, C. A. (2009). Analysis of *Egeriaradiata* and *Thaiscoronata* shells as alternative sources of calcium for food industries in Nigeria. *PakistanJournalofNutrition*, 8(7): 965-969.

Acknowledgements

- The authors wish to thank the Animal Genetics and Genomics unit, Department of Genetics and Biotechnology, University of Calabar, Nigeria for the support granted to facilitate this research.

Acknowledgements

- The authors wish to thank the Animal Genetics and Genomics unit, Department of Genetics and Biotechnology, University of Calabar, Nigeria for the support granted to facilitate this research.



This work is licensed under a Creative Commons Attribution 4.0 International License.

